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[별지 제41호서식]

공증
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HANBYUL, P.C. & NOTARY PUBLIC

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[Bibliographic Data]

[Name of Document] Amendment

[To] The Commissioner of the Korean Intellectual Property Office

[Filing Date] 2004.06.29

[Submitter]

[Name] SCIENCITY., LTD

[Applicant Code] 1-2000-054586-1

[Relation to the Case] Applicant

[Attorney]

[Name] Lee, Sei-Jin

[Attorney Code] 9-2000-000320-8

[General Power of Attorney Code] 2003-018347-8

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[Name] Kim, Sung-Nam

[Attorney Code] 9-1998-000150-9

[General Power of Attorney Code] 2003-018346-1

[Indication of the Case]

[Application Number] 10-2003-0019715

[Filing Date] 2003.03.28

[Examination Date] 2004.03.17

[Title of Invention] Aortic valve Repairing Apparatus Sets and Treatment Method Using The Same

[Reason of Submission]

[Mailing Number] 9-5-2004-0229502-44

[Mailing Date] 2004.06.08

[Document to be Amended] Specification

[To be Amended]

[Amended Item] Attached Document

[Method of Amendment] Attached Document

[Contents of Amendments] Attached Document

[Gist of Application] We submit the Amendment, as above, according to Article 13 of the Enforcement Regulation of the Patent Act and Article 17 of the Enforcement Regulation of the Utility Model Act.

Attorney Lee, Sei-Jin (Seal)

Attorney Kim, Sung-Nam (Seal)

[Fees]

[Amendment Fee] 3,000 Won

[Additional Examination Fee] 0 Won

[Other Fees] 0 Won

[Total] 3,000 Won

[Attached Document] 1. An amendment certificate_1sheet

[Amendment]

[Amended Item] Claim 1

[Method of Amendment] Amended

[Contents of Amendments]

[Claim 1]

An apparatus for restoring aortic valve which is used for the correction of aortic valvular regurgitation caused by increase in the diameter of aortic annulus and sinotubular junction,

wherein the apparatus for restoring aortic valve consists of:

the aortic annulus repairing apparatus in band or ring type, consists of the inner stabilizer (12) that stabilizes the diameter of aortic annulus from the inside of the aortic lumen and the outer felt stabilizer (14) that supports the diameter from the outside of the aortic lumen; and

the sinotubular junction repairing apparatus in ring type, consisting of the inner stabilizer in ring type (22) that stabilizes the diameter of sinotubular junction and the outer felt stabilizer (24) in ring type that supports the above diameter from outside of sinotubular junction.

[Amended Item] Claim 2

[Method of Amendment] Cancelled

[Amended Item] Claim 3

[Method of Amendment] Cancelled

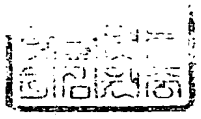
[Amended Item] Claim 4

[Method of Amendment] Amended

[Contents of Amendments]

[Claim 4]

The apparatus for restoring aortic valve as set forth in claim 1, wherein the sewing passage of the inner stabilizer (12) is formed thinner than the surrounding area in order to stick the stabilizer tightly well on the wall of the aortic lumen.



[Amended Item] Claim 5

[Method of Amendment] Amended

[Contents of Amendments]

[Claim 5]

The apparatus for restoring aortic valve as set forth in claim 1, wherein the inner stabilizer (12) and the outer felt stabilizer (14) of the ring type have three equally spaced markers (10) in the circumference, which enables to determine the direction of the stabilizer.

[Amended Item] Claim 6

[Method of Amendment] Amended

[Contents of Amendments]

[Claim 6]

The apparatus for restoring aortic valve as set forth in claim 1, wherein the inner stabilizer 12 and the outer felt stabilizer 14 are formed in a band type in order to fix only a fibrous part of the annulus and leave the muscular part to be movable; and wherein the inner stabilizer 12 and the outer felt stabilizer 14 have vertical marks on both ends in order to indicate a location of the muscular part and have about 2 mm of extra margin outside of the vertical lines which enable its stabilization more easily.

[Amended Item] Claim 7

[Method of Amendment] Amended

[Contents of Amendments]

[Claim 7]

The apparatus for restoring aortic valve as set forth in claims 1 to 6, wherein the inner stabilizer (12) and outer felt stabilizer (14) are made of any synthetic fiber or biological material harmless to human.

[Amended Item] Claim 8

[Method of Amendment] Cancelled

[Amended Item] Claim 9

[Method of Amendment] Cancelled

[Amended Item] Claim 10

[Method of Amendment] Amended

[Contents of Amendments]

[Claim 10]

The apparatus for restoring aortic valve as set forth in claim 1, wherein the suture passage of the above inner stabilizer (22) is formed thinner than the surrounding part in order to stick the stabilizer tightly well on the surrounding wall in the sinotubular junction.

[Amended Item] Claim 11

[Method of Amendment] Amended

[Contents of Amendments]

[Claim 11]

The apparatus for restoring aortic valve as set forth in claim 1, wherein the inner stabilizer (22) and the outer felt stabilizer (24) of the ring type have three equally spaced markers (10) in the circumference, which enables to determine the direction.

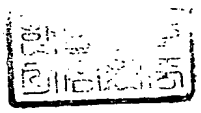
[Amended Item] Claim 12

[Method of Amendment] Amended

[Contents of Amendments]

[Claim 12]

The apparatus for restoring aortic valve as set forth in claim 1, 10 or 11, wherein the inner stabilizer (22) and outer felt stabilizer (24) are made of any synthetic fiber or biological material harmless to human.



[Amended Item] Claim 13

[Method of Amendment] Cancelled

[Amended Item] Claim 14

[Method of Amendment] Cancelled

[Bibliographic Data]

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[Submitter]

[Name] SCIENCITY., LTD

[Applicant Code] 1-2000-054586-1

[Relation to the Case] Applicant

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[Attorney Code] 9-2000-000320-8

[General Power of Attorney Code] 2003-018347-8

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[Name] Kim, Sung-Nam

[Attorney Code] 9-1998-000150-9

[General Power of Attorney Code] 2003-018346-1

[Indication of the Case]

[Application Number] 10-2003-0019715

[Filing Date] 2003.03.28

[Title of Invention] Aortic valve Repairing Apparatus Sets and Treatment Method Using The Same

[Reason of Submission]

[Mailing Number] 1-1-2003-0111833-82

[Mailing Date] 2003.03.28

[Document to be Amended] Specification

[To be Amended]

[Amended Item] Attached Document

[Method of Amendment] Attached Document

[Contents of Amendments] Attached Document

[Gist of Application] We submit the Amendment, as above, according to Article 13 of the Enforcement Regulation of the Patent Act and Article 17 of the Enforcement Regulation of the Utility Model Act.

Attorney Lee, Sei-Jin (Seal)

Attorney Kim, Sung-Nam (Seal)

[Fees]

[Amendment Fee] 0 Won

[Additional Examination Fee] 0 Won

[Other Fees] 0 Won

[Total] 0 Won

[Attached Document] 1. An amendment certificate_1sheet

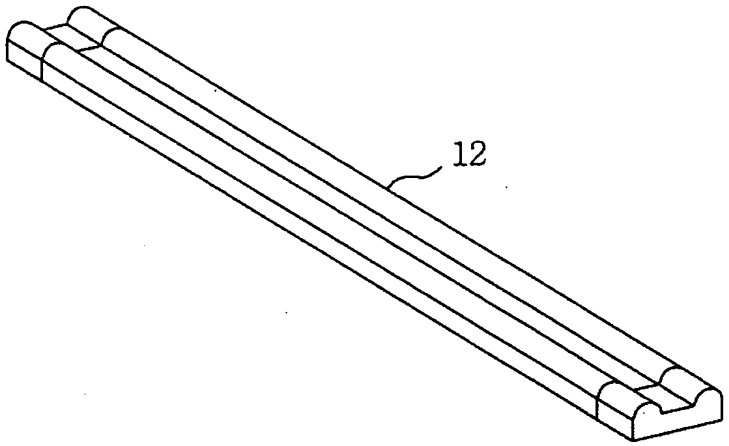
[Amendment]

[Amended Item] Figure 1a

[Method of Amendment] Amended

[Contents of Amendments]

[Figure 1a]



[Bibliographic Data]

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[Category of Right] Patent

[To] The Commissioner of the Korean Intellectual Property Office

[Filing Date] 2003.03.28

[Korean Title of Invention] 대동맥판막 성형기구 세트 및 이를 이용한 치료방법

[English Title of Invention] Aortic valve Repairing Apparatus Sets and Treatment Method Using The Same

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[Name] SCIENCITY., LTD

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[Nationality] KR

[Gist of Application] We file the application as above according to Article 42 of the Patent Act.

Attorney Lee, Sei-Jin (Seal)

Attorney Kim, Sung-Nam (Seal)

[Fees]

[Basic Fee]	20 Sheet(s)	29,000 Won
[Additional Fee]	0 Sheet(s)	0 Won
[Priority Claiming Fee]	0 case(s)	0 Won
[Examination Fee]	0 Claim(s)	0 Won
[Total]	29,000 Won	
[Exemption Reason]	Small-sized Enterprise	
[Exempted Fee]	14,500 Won	

[Attached Document] 1. Abstract·Specification(Drawings)_1sheet 2. A small-sized Enterprise certificate according to Article 2 of the Enforcement Ordinance of the Small-sized Enterprise _1sheet

[Abstract]

[Summary]

The present invention relates to an apparatus for restoring aortic valves, and more particularly, to an apparatus for restoring aortic valves used for the treatment of simple aortic regurgitation or damage to an aortic valve occurring during an aortic dissection..

The present invention provides an aortic annulus repairing apparatus consisting of: an inner stabilizer in band or ring type that stabilizes the diameter of the aortic annulus from inside the aortic lumen and an outer felt stabilizer in band type that supports the diameter from outside the aortic lumen; a sinotubular junction repairing apparatus consisting of an inner stabilizer in ring type that stabilizes the diameter of the sinotubular junction and an outer felt stabilizer in ring type that supports the above diameter from outside the sinotubular junction.

[Representative Drawing]

Fig. 1a

[Index]

an aortic annulus, a sinotubular junction, an aortic regurgitation, an aortic annulus inner stabilizer, an aortic annulus outer felt stabilizer, a sinotubular junction inner stabilizer, a sinotubular junction outer felt stabilizer

[Specification]

[Title of the Invention]

Aortic valve Repairing Apparatus Sets and Treatment Method Using The Same

[Brief Description of the Drawings]

FIG. 1a is a perspective view of an aortic annulus inner stabilizer in band type according to the present invention.

FIG. 1b is a perspective view of an aortic annulus inner stabilizer in ring type according to the present invention.

FIG. 1c is a cross sectional view of an aortic annulus inner stabilizer in band type or in ring type according to the present invention.

FIG. 2 is a perspective view of an aortic annulus outer felt stabilizer in band type according to the present invention.

FIG. 3a is a perspective view of a sinotubular junction (STJ) inner stabilizer in ring type according to the present invention.

FIG. 3b is a cross-sectional view of a sinotubular junction (STJ) inner stabilizer in ring type according to the present invention.

FIG. 4 is a perspective view of a sinotubular junction (STJ) outer felt stabilizer in ring type according to the present invention.

<Description for marks>

12, 22 : an inner stabilizer 14, 24 : an outer felt stabilizer

[Description]

[Purpose of the Invention]

[Technical Field and Background Art]

The present invention relates to an apparatus for restoring aortic valves, and more particularly, to an apparatus for restoring aortic valves used for the treatment of simple aortic regurgitation or damage to an aortic valve occurring during an aortic dissection.

The heart has four valves which ensure forward flow of incoming blood to the systemic circulation. The left side has the mitral valve which is positioned between the left atrium and left ventricle and the aortic valve which is located at the junction of the left ventricular outflow tract and the aortic root. The function of these two valves is to ensure that oxygenated blood from the lung continues to flow into aortic root through the left side of the heart in a forward direction. In the right side of the heart, there are two similar valves called the tricuspid valve and the pulmonary valve.

These four valves are entirely passive structures which neither consume energy nor contract dynamically. These valves are composed of leaflets which passively open and close dictated by the pressure difference created. The mitral and tricuspid valves are called atrioventricular valves since they are located between atrium and ventricle. The mitral valve is composed of two leaflets and the tricuspid valve is composed of three leaflets. The aortic and pulmonary valves are called semilunar cusps since the leaflets are semilunar in shape. Both of the aortic and pulmonary valves have three cusps.

Heart valves may be affected by abnormality in structure and function by congenital or acquired valve disorder. Congenital valve abnormalities may either manifest with life-threatening disorder at birth or remain latent until mid life or even later in life. Acquired disorders are frequently caused by conditions such as rheumatic fever, degenerative disorder, infection or trauma.

Severe aortic regurgitation may be caused by aortic dissection, in which case aortic

valve replacement is usually required. In addition, serious aortic regurgitation may also occur as a result of rheumatic or degenerative valvular disease. The mainstay of prosthetic valves used in aortic valve disease is so called mechanical valve and tissue valves, both of the stented type. The leaflets of mechanical valves are constructed of pyrolitic carbon material encased in a titanium housing. Tissue valves are composed of materials derived from animal tissue. Tissue valves are commonly constructed over a skeletal frame of titanium with an outer sewing rim to facilitate suture implantation. The valve material per se may either come from bovine pericardium or from the porcine aortic valve treated in glutaraldehyde. These prosthetic apparatus are implanted in the patients' aortic annulus after the diseased aortic leaflets have been removed.

To prevent thrombotic complications after a mechanical valve implantation, lifelong anticoagulation is essential. Even with anticoagulation, patients could still experience bleeding or thrombotic complications. On the other hand, tissue valves are generally free of such complications, obviating anticoagulation, but tissue valves have relatively limited durability compared to mechanical valves. As a result these patients require future reoperation. To overcome the limitations of these different types of artificial valves, a durable method of aortic valve restoration is desirable. However, at present aortic valve repair is considered feasible in only certain selected situations.

The aortic root not only serves as a simple passage for blood, but it is also a highly sophisticated elastic structure which allow cyclic expansion of the aortic diameter to as much as 30% of its basal diameter according to the rhythmic changes of the cardiac cycle.

Since this structure is sustained under very high blood pressures, most of the existing methods of aortic valve repair unable to withstand the associated mechanical stress are prone to failure and relapse.

The three major factors to preserve the function of the aortic valve include maintaining the appropriate diameter of the sinotubular junction and the aortic annulus, and state of the leaflets per se. Only when the functions of these three factors are optimally recovered, the aortic valve function can be successfully restored. Existing methods to repair the aortic valve haven't met these requirements entirely. For example, resuspension of the aortic valve leaflets inside an artificial vascular conduit has been suggested as an effective method of repairing ascending aortic aneurysm due to Marfan syndrome with morphologically normal aortic leaflets. However, this method is applicable only to limited situations. One drawback is that the sinus portion in the proximal aortic root has to be removed. Furthermore, this method may lead to serious bleeding complications in aortic dissection as sutures are passed through friable and edematous tissue.

Another surgical method applicable to Marfan patients, is replacement of aneurysmal ascending aortic tissue with a suitably tailored segment of a vascular conduit. However, this method is also prone to serious bleeding in aortic dissection or even in simple aneurysms in these patients. Furthermore, this method also shares the same drawback having to remove the function of the native sinus of Valsalva.

In contrast to these methods, replacement of the dysfunctional valve leaflets with glutaraldehyde fixed autologous pericardium may appear to correct the problem of aortic regurgitation, but in the long term, leaflet coaptation will eventually fail as this function is dictated by the diameters of the sinotubular junction and the aortic annulus, both of which may progressively increase.

[Technical Problem]

The present invention has been devised with the aims of addressing the above

problems, while at the same time restoring the normal functioning of the aortic valve by affecting not only the aortic leaflets but also the surrounding structures comprising the aortic root.

The present invention provides an aortic annulus repairing apparatus consisting of: an inner stabilizer in band or ring type that stabilizes the diameter of the aortic annulus from inside the aortic lumen and an outer felt stabilizer in band type that supports the diameter from outside the aortic lumen; a sinotubular junction repairing apparatus consisting of an inner stabilizer in ring type that stabilizes the diameter of the sinotubular junction and an outer felt stabilizer in ring type that supports the above diameter from outside the sinotubular junction.

[Mode for Invention]

The apparatus according to the present invention is used for the treatment of simple aortic regurgitation or aortic regurgitation derived from aortic dissection or aortic regurgitation accompanied by ascending aortic aneurysm or annuloaortic ectasia etc. By fixing the diameter of the aortic annulus and the sinotubular junction, the apparatus of the present invention is able to provide effective repair of aortic regurgitation.

Aortic regurgitation is caused among other causes by increase in diameter of the sinotubular junction (STJ), increase in diameter of the aortic annulus, and degeneration of the aortic leaflets. In case of aortic regurgitation caused by increase in aortic annular diameter and STJ, aortic regurgitation may be effectively corrected by normalizing the diameters in STJ and aortic annular diameters.

Hereinafter, the preferred embodiments of the present invention will be described in detail with reference to the attached drawings.

FIG. 1a is a perspective view of an aortic annulus inner stabilizer in band type according to the present invention. FIG. 1b is a perspective view of an aortic annulus inner stabilizer in ring type according to the present invention. FIG. 1c is a cross-sectional view of an aortic annulus inner stabilizer in band type or in ring type according to the present invention. FIG. 2 is a perspective view of an aortic annulus outer felt stabilizer in band type according to the present invention. FIG. 3a is a perspective view of a sinotubular junction (STJ) inner stabilizer in ring type according to the present invention. FIG. 3b is a cross-sectional view of a sinotubular junction (STJ) inner stabilizer in ring type according to the present invention. Lastly, FIG. 4 is a perspective view of a sinotubular junction (STJ) outer felt stabilizer in ring type according to the present invention.

The apparatus for restoring aortic valves includes an apparatus for uniformly fixing the diameter of the aortic annulus, and an apparatus for uniformly fixing the diameter of the sinotubular junction. Each apparatus includes a pair consisting of an inner stabilizer which stabilizes the diameter from inside the aortic lumen and an outer stabilizer that supports the inner stabilizer from outside the aorta.

Referring to FIGS. 1 and 2, the apparatus for restoring aortic valve consists of the inner stabilizer in band or ring type (12) which stabilizes the diameter of aortic annulus from inside the aortic lumen and the outer felt stabilizer in band type (14) that supports the diameter from outside the aortic lumen.

The inner stabilizer 12 serves to measure and fix the diameter of the annulus to fit an original size, and is made of a flexible material. The inner stabilizer 12 is formed in band type to fix only a fibrous part of the aortic annulus except for the muscular part. However, when the muscular part of the aortic annulus is also expanded, the ring type inner stabilizer 12 that fixes a circumference of the entire annulus may be used.

A portion of the inner stabilizer 12 through which a suture passes is made thinner than the surrounding thickness such that the inner stabilizer 12 is more closely adhered to a peripheral inner wall in the aortic lumen (see FIG. 1c). When the inner stabilizer is formed in ring type, location marks are present at trisections of the circumference, and thus can be used to determine a direction (see FIG. 1b). When the inner stabilizer is formed in a band type, vertical lines indicating a location of a root are drawn at both ends of the band, such that only the fibrous part is fixed and the muscular part is left movable. In addition, the band has approximately 2 mm margins outside the vertical lines to be easily fixed (see FIG. 1a).

The outer felt stabilizer 14 is coupled with the inner stabilizer 12 to uniformly fix the diameter of the aortic annulus. The outer felt stabilizer 14 is disposed outside the wall of the aorta. The outer felt stabilizer 14 also has vertical marks indicating trisections.

The inner stabilizer 12 and the outer felt stabilizer 14 may be made of any synthetic fibers such as polyester or polytetrafluoroethylene, which are harmless to humans.

Referring to FIGS. 3 and 4, the sinotubular junction repairing apparatus includes the inner stabilizer in ring type (22) that stabilizes the diameter of sinotubular junction and the outer felt stabilizer in ring type (24) that supports the above diameter from outside the sinotubular junction.

The sinotubular junction rings are all formed in a ring type, not a band type, and thus serve to support both inside and outside the wall of the aorta at the sinotubular junction level.

Among these, the inner stabilizer 22 is made of a flexible synthetic fiber and has a structure in which a portion through which a suture passes is made thinner than upper and lower surrounding thicknesses in order to be closely adhered to the wall of the aorta, like the inner stabilizer 12 for the annulus (see FIG. 3b). In addition, the ring type stabilizer has marks indicating trisections of its circumference (see FIG. 3a).

The outer felt stabilizer 24 for the sinotubular junction is coupled with the inner stabilizer 22 to uniformly fix the diameter of the sinotubular junction. The outer felt stabilizer 24 is disposed outside the wall of the aorta. The outer felt stabilizer 24 also has vertical marks indicating trisections (see FIG. 4).

The surgical technique using aortic valve repair apparatus according to the present invention is as follows: To correct aortic regurgitation secondary to increased diameter of the aortic annulus, a ring or band type stabilizer aimed to decrease the aortic annulus diameter to the desired dimension is implanted in the aortic annulus serving as the inner stabilizer (12).

The band type annulus outer stabilizer is placed on the corresponding outside aortic wall to structurally support. These two stabilizers implanted on both the inside and outside surfaces of the aortic annulus, decrease the diameter of aortic annulus to the desired dimension and thereby effectively correct aortic regurgitation.

When aortic regurgitation of the aortic valve occurs because of the increase in diameter of the sinotubular junction, the inner stabilizer in ring type 22 for the sinotubular junction is inserted into the inside portion of the sinotubular junction, and the outer felt stabilizer 24 is attached to the outside of an aortic vessel of the sinotubular junction to support the inner stabilizer 22. These two stabilizers serve to fix the sinotubular junction from both inside and outside, and thereby the diameter of the sinotubular junction is normalized, leading to treatment of the aortic regurgitation.

Where abnormal enlargement has occurred at both the annulus and STJ levels, aortic regurgitation may be corrected by repairing the aortic root at both of these levels as described. Furthermore, securing repair of the aortic root at both of these levels may effectively prevent recurrence of aortic regurgitation resulting from the dilatation of the untreated component.

It should be understood to one skilled in the art that other variations may be possible without changing the scope of the accompanying claims or essential characteristics. While exemplary embodiments have been disclosed herein, it should be understood that the disclosure is not limited to the embodiments. The scope of the present invention is described with reference to the accompanying claims, not to the detailed description, and all such modifications departing from the meaning and scope of the claims and their equivalents are intended to be included within the scope of the accompanying claims.

[Effect of the Invention]

According to the present invention, to treat aortic regurgitation of the aortic valve, the aortic annulus stabilizer in band or ring type and the sinotubular junction stabilizer in ring type are used to fix internal and external diameters of the aortic annulus and the sinotubular junction. Therefore, the function of one's own aortic valve is restored without using an artificial valve. In addition, by reinforcing an aortic root by attaching the felt stabilizer from outside of an aorta, the bleeding can be considerably reduced and the function of an aortic sinus can be retained.

[Claims]

[Claim 1]

An apparatus for restoring aortic valve which is used for the correction of aortic valvular regurgitation caused by increase in the diameter of aortic annulus and sinotubular junction, wherein the apparatus for restoring aortic valve consists of the aortic annulus repairing apparatus in band or ring type that stabilizes uniformly the diameter of aortic annulus and the sinotubular junction repairing apparatus in ring type that stabilizes uniformly the diameter of sinotubular junction.

[Claim 2]

The apparatus for restoring aortic valve as set forth in claim 1, wherein the aortic annulus repairing apparatus consists of the inner stabilizer (12) that stabilizes the diameter of aortic annulus from the inside of the aortic lumen and the outer felt stabilizer (14) that supports the diameter from the outside of the aortic lumen.

[Claim 3]

The apparatus for restoring aortic valve as set forth in claim 2, wherein the inner stabilizer 12 and the outer felt stabilizer 14 are formed in a band type or a ring type , a circular shape of joining the band type.

[Claim 4]

The apparatus for restoring aortic valve as set forth in claim 2, wherein the sewing passage of the inner stabilizer (12) is formed thinner than the surrounding area in order to stick the stabilizer tightly well on the wall of the aortic lumen.

[Claim 5]

The apparatus for restoring aortic valve as set forth in claim 2 or 3, wherein the inner stabilizer (12) and the outer felt stabilizer (14) of the ring type have three equally spaced

markers (10) in the circumference, which enables to determine the direction of the stabilizer.

[Claim 6]

The apparatus for restoring aortic valve as set forth in claims 2 and 3, wherein the inner stabilizer 12 and the outer felt stabilizer 14 are formed in a band type in order to fix only a fibrous part of the annulus and leave the muscular part to be movable; and wherein the inner stabilizer 12 and the outer felt stabilizer 14 have vertical marks on both ends in order to indicate a location of the muscular part and have about 2 mm of extra margin outside of the vertical lines which enable its stabilization more easily.

[Claim 7]

The apparatus for restoring aortic valve as set forth in claims 2 to 4, wherein the inner stabilizer (12) and outer felt stabilizer (14) are made of any synthetic fiber or biological material harmless to human.

[Claim 8]

The apparatus for restoring aortic valve as set forth in claim 1, wherein the sinotubular junction repairing apparatus is composed of the inner stabilizer in ring type (22) that stabilizes the diameter of sinotubular junction and the outer felt stabilizer (24) in ring type that supports the above diameter from outside of sinotubular junction.

[Claim 9]

The apparatus for restoring aortic valve as set forth in claim 8 wherein the inner stabilizer (22) and outer felt stabilizer (24) are formed in a ring type.

[Claim 10]

The apparatus for restoring aortic valve as set forth in claim 8, wherein the suture passage of the above inner stabilizer (22) is formed thinner than the surrounding part in order to stick the stabilizer tightly well on the surrounding wall in the sinotubular junction.

[Claim 11]

The apparatus for restoring aortic valve as set forth in claim 8 or 9, wherein the inner stabilizer (22) and the outer felt stabilizer (24) of the ring type have three equally spaced markers (10) in the circumference, which enables to determine the direction.

[Claim 12]

The apparatus for restoring aortic valve as set forth in claims 8 to 10, wherein the inner stabilizer (22) and outer felt stabilizer (24) are made of any synthetic fiber or biological material harmless to human.

[Claim 13]

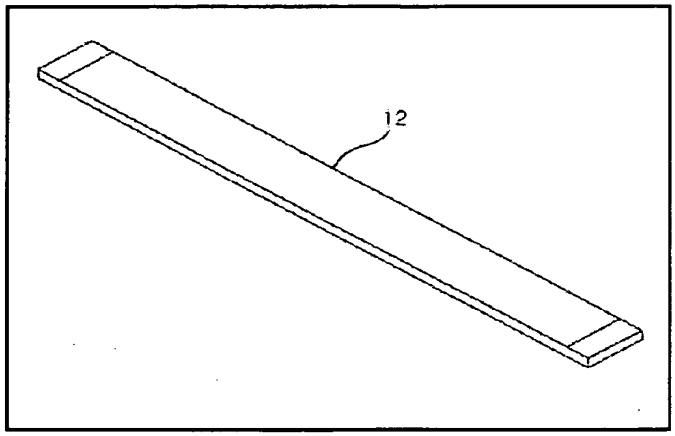
A treatment method for the aortic valvular regurgitation using the aortic valve restoring apparatus as set forth in claims 1 to 8, wherein aortic annulus inner stabilizer (12) in band type or ring type is implanted to inside of the aortic lumen, and the annulus outer felt stabilizer (14) is located to the outside of the aortic lumen to support the above annulus inner stabilizer, and thus normalizing the diameter of aortic annulus which is an effective treatment for the aortic valvular regurgitation.

[Claim 14]

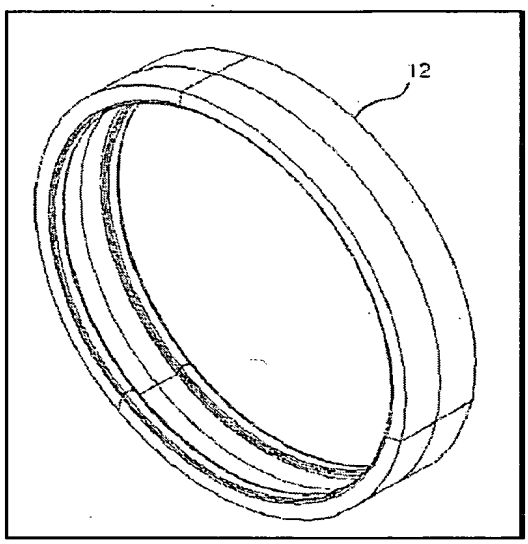
A treatment method for the aortic valvular regurgitation using the aortic valve repairing apparatus as set forth in claims 1 or 8 to 12, wherein STJ inner stabilizer in the ring type is implanted to the inside of the sinotubular junction, and the STJ outer felt stabilizer is located to the outside of the sinotubular junction to support the above STJ inner stabilizer, and thus normalizing the diameter of sinotubular junction.

[Drawings]

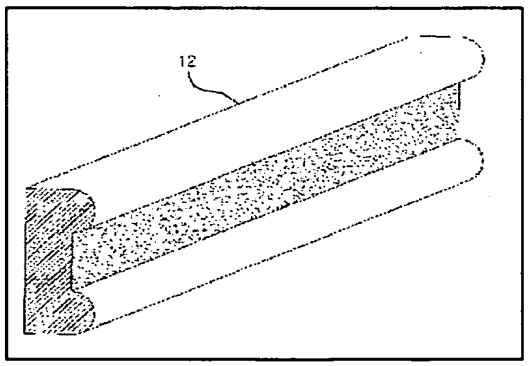
[Figure 1a]



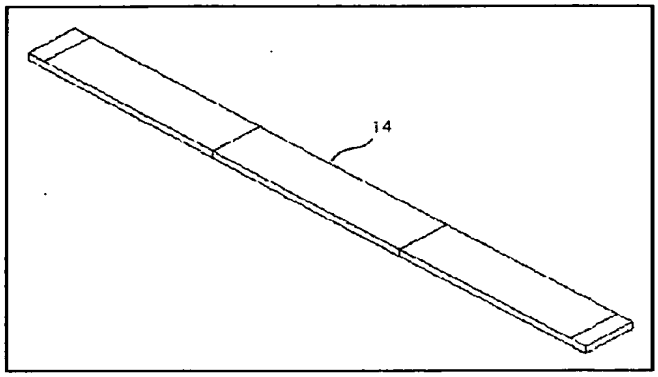
[Figure 1b]



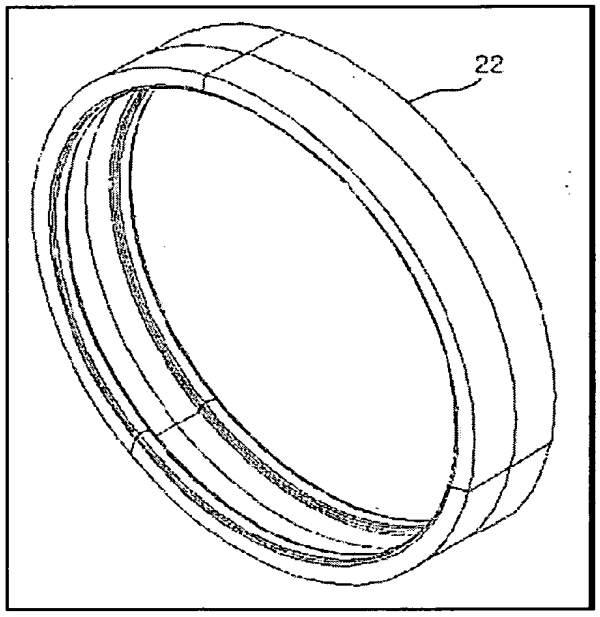
[Figure 1c]



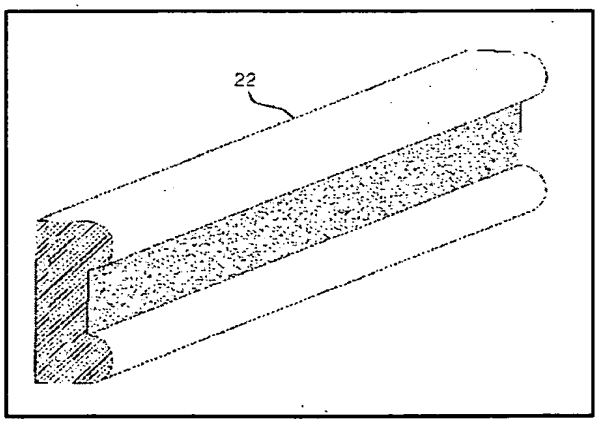
[Figure 2]



[Figure 3a]



[Figure 3b]



[Figure 4]